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elementary schools, especially in country districts, where it would appear to be even more important than in towns. A boys' or girls' school can obtain the highest credit in the inspector's report, and the highest possible grant of money, without its scholars having ever heard of animal or plant, or of those materials of the world, or of those natural forces, with which the scholars will have to deal all through their lives; and, what is perhaps still more anomalous, those pupil-teachers who are possibly expected to give object-lessons in their schools are never examined in natural history by the department, and may gain a high place in their examinations without the least knowledge of any kind of natural science.

It seems most desirable that every little child who enters school should be led to observe and inquire; its curiosity and activity should be encouraged and directed; only when its senses have been made acquainted with things should it be introduced to the words by which they are called, first orally, then in writing or print. It should proceed from the concrete to the abstract. The works of the Creator are as worthy to be studied as the words of men, and should hold as high a place in any school curriculum.

The reply of the department to such requests as these will probably be, "We cannot assume that the teachers are capable of teaching, or the inspectors of examining science." No doubt there is that difficulty. But many of them are capable, and they are all presumably intelligent men, who would easily learn what might be required of them. Special teachers of science also exist, and special examiners might be appointed. It may not be possible to insist on all these reforms at once, but at least encouragement should be held out to them, instead of the disappointing uncertainties of the code now before Parliament.

#### HEALTH MATTERS.

##### Tuberculosis Contagion.

DR. VON DUHRING reports to the *British Medical Journal* a case of tuberculosis which was contracted by wearing a pair of earrings. The patient, a girl of fourteen years, removed the earrings from the ear of a young girl who died of consumption, and wore them in her own ears. Soon after, an ulcer formed in the left ear, the discharge from which, when examined, was found to contain tubercle bacilli, and a gland in the neck also enlarged and ulcerated. The patient developed pulmonary consumption, and at the date of the report was sinking rapidly.

This case is one of great interest as showing another channel by which the bacilli of tuberculosis may enter the system. The inquiry will naturally suggest itself, whether this patient was not already phthisical at the time she began to wear the earrings, and the development of the disease at that time a mere coincidence. This would seem the more probable from the age of the patient, which was fourteen years. Then, too, the report states that these two girls were intimate friends, so that the seed may have been sown during their lifetime. Some years ago either of these explanations would, to most minds, have been sufficient; but, through the researches of Koch, an additional means of determining the question has been made available. This is the detection of the bacilli themselves. The report states that this was done in the case mentioned; and, as the methods are simple and decisive, there is no reason to doubt the accuracy of the report. The enlargement of the gland in the neck is additional evidence that the earrings were the source of the infection. It would be interesting to know whether the ears of the first patient were ulcerated or not.

#### ELECTRICAL NEWS.

ELECTRICAL COURSE AT COLUMBIA COLLEGE.—In view of the prodigious strides which electricity is now making, it is but natural that the necessity for the establishment of a means whereby its thorough and systematic study can be undertaken should have engaged the attention of educational bodies in this country. Columbia College, which has always occupied a prominent position in science, has now established a course of electrical engineering. As its professors, it has secured the services of two men of

excellent repute in electrical and mathematical circles. Mr. Francis B. Crocker, who assumes the instructorship, is no stranger to many of our readers. As one of the inventors of the C. & C. motor, his name has for some time been conspicuously before the public; and his papers read before the American Institute of Electrical Engineers (among which may be specially mentioned that on "Chemical Generators of Electricity," last year) and other scientific bodies have never failed to meet with a welcome. Mr. Crocker is regarded as a rising man in electrical circles; and in this view it is significant that he was, a few weeks ago, elected to the presidency of the New York Electrical Society, which is the oldest organization of its kind in the country. Mr. Michael Pupin is the assistant instructor. From Mr. Pupin's past work and present reputation, great things are expected of him, and he brings to his new sphere of action the additional prestige of having studied under Helmholtz in Berlin.

#### NOTES AND NEWS.

DURING the past year the director of the Michigan Weather Service has had compiled the average monthly rainfall for each section of that State, and has had the figures published in the monthly report. Believing that the information thus compiled could be better shown by being charted, the director made a chart of the State, showing the average monthly rainfall for each month and for the year. These charts were made up from the observations of thirteen years, and about four thousand reports were examined and proved, to obtain the data. There were also made the charts of the monthly and annual rainfall for the past year which are to accompany the normal charts. These charts will be of great value to the people of Michigan, as the rainfall can be readily compared with the normal, and thus ascertain in each locality whether the rainfall has been the average or not.

— Professor Rosenthal of Erlangen, at a meeting of the Berlin Physiological Society, March 27, gave an account of calorimetric experiments with which he had been busied for the last few years. He employed in these, says *Nature*, an air-calorimeter of special construction. It consisted of a copper vessel, of easy ventilation, in which the animal was placed; this was surrounded by an airtight envelope, filled with air and constituting the reservoir of an air-thermometer; external to this was a covering to shield the whole apparatus from any changes in the temperature of the surrounding atmosphere. When the animal gives up to the envelope of air, per unit of time, exactly the same amount of heat as the whole apparatus radiates into the surroundings, the temperature of the air in the envelope remains constant, as also its pressure; hence the heat produced and given off by the animal during any known time could be measured by means of a manometer. Notwithstanding that the dog used in the experiments was fed in exactly the same way at each meal, the quantities of heat produced varied very largely, and any considerable uniformity is only obtained by taking the mean of a long series of observations. Up to about the third hour after the meal, the heat-production diminishes, then rises rapidly to a maximum; and from this point, at about the eighth hour, it begins to fall again slowly, and with irregularities, until the next meal. Over the whole twenty-four hours the heat-production is more uniform during the second period of twelve hours than in the first; about 20 per cent more heat is produced during the first than during the second half of the whole day. When an excess of food was given, the heat produced was always less than that calculated out from the oxidation of the food itself; but, with a uniformly constant diet, the mean value of the heat produced corresponded to the heat calculated for the oxidation of the food. The amount of carbonic-acid gas given off by the animal was found to correspond to the heat given off during the same period only in cases where prolonged intervals of time were taken into account. When the surrounding temperature varied between 5° and 25° C., all other conditions remaining the same, a minimum production of heat was observed at 15° C.: from this point it increased uniformly in both directions, not only when the temperature fell to 5° C., but also when it rose to 25° C. Professor Schweigger demonstrated several pieces of apparatus, which, by the use of small incandescent electric lamps, could take the place of the ophthalmoscope, and even